that usually results from two years of the most conscientious teaching of inorganic chemistry, no matter how, by whom, or to whom the teaching be administered. The book is condensed, but it is not dull; there is, in fact, a sort of grip about it which is decidedly sustaining. Many subjects of difficulty, such as the complex cyanides and the amines, are treated with much clearness and perspicuity, and most new things in inorganic chemistry are well elucidated. It is really a work on systematic chemistry, a study of chemical compounds *per se*, detached from all the arts of man, a sort of comparative anatomy based on the periodic law. Judged from this point of view, and not as a work that purports to contain all that a degree student should know of inorganic chemistry, it seems to the present writer as good as any work that has been written with the same object, and a great deal better than most of them.

Very few mistakes have been noticed in reading the book, but the expression (p. 8), "the modified form of Gay-Lussac's law is Avogadro's law," would shock the author of the first book under notice, and it is certainly not felicitous. On p. 44 the hydrides of sodium and potassium are (in view of Moissan's work) unfairly denied the character of definite compounds; and on p. 202 nitrogen trioxide is said to dissociate completely into nitric oxide and nitrogen peroxide on evaporating. The authors propose and use the terms *basigenic* and *oxygenic* respectively for base-producing and acid-producing, and there seems to be some need for such words; it is certainly confusing to speak of the basic properties of oxygen and the basic properties of caustic soda.

ARTHUR SMITHELLS.

GEOGRAPHY FOR SCHOOLS.

A Progressive Course of Comparative Geography on the Concentric System. By P. H. L'Estrange. Pp. xii+148. (London: Geo. Philip and Son, Ltd., 1906.) Price 6*s.* net.

Philips' Progressive Atlas of Comparative Geography. Edited by P. H. L'Estrange. Pp. 148. (London: Geo. Philip and Son, Ltd., n.d.) Price 3*s.* 6*d.* net.

Stanford's Octavo Atlas of Modern Geography. Third edition. Pp. 104+50 maps. (London: Edward Stanford, 1906.) Price 25*s.*

THE very title of Mr. L'Estrange's book expresses an admirable idea. The graduation of geographical teaching in such a way as to adapt the matter to boys and girls of different ages, and yet to make it educational at every stage, and hence to present at successive stages tasks of gradually advancing difficulty, is admittedly one of the hardest and at the same time one of the most important problems which the teacher has to face. In his attempt to accomplish this task Mr. L'Estrange has produced a work on which a very great amount of thought and pains have been bestowed, with such a wealth of instructive maps extremely useful for teaching purposes, and of equally instructive pictorial illustrations, and with a text possessing so many valuable features, that it may be unhesitatingly and cordially recommended to every teacher of geography.

It is to be regretted, however, that one cannot feel the same confidence in recommending the book for the use of the pupils. Notwithstanding all that Mr. L'Estrange has succeeded in doing, notwithstanding the fact that he has made important contributions to the solution of the problem that he has set himself, it can scarcely be admitted that he has been quite successful in so mastering the store of information he has amassed as to lead the learner securely onwards in the manner he has designed. This results partly, it would seem, from the fact that he has never formed any clear conception of the function of geography as distinguished from geology. He gives us no definition of the subject, but opens at once with an account of the structure of the earth's crust such as is given by the geologist. The greater part of this account is, no doubt, also of geographical interest, but if Mr. L'Estrange had recognised the fact that geography and geology differ in their points of view, he would probably have given less importance to some and greater importance to other parts of his physical geography.

The main feature of Mr. L'Estrange's work is an attempt to graduate the subject in three stages, A, B, and C, the A stage suitable to the lower section of a school in which a boy may spend two years, the others to the higher sections. The boy is intended in each successive stage to go over the same ground, to gain additional knowledge and to exercise his thoughts on more difficult problems in the higher stages, but "all without overlapping or ill-ordered acquisition of knowledge." This plan is followed both in the text and the maps, and the manner in which it is carried out in the maps is one of the most important contributions the author has made to the accomplishment of his task.

The plan is in a large measure sound, but probably most teachers will be disposed to think that he has pushed the idea of covering the same ground at every stage too far. They will question whether some of the subjects dealt with are suited for the A stage at all; for instance, that of map projections, which is distributed in a very unsatisfactory manner over stages A, B, and C. This fault, however, can be remedied by the teacher himself reserving the entire subject for the C stage. It is a more serious defect where we find that a reference to a higher stage is necessary to the complete understanding of a lower one, or ideas suited only to a more advanced stage are introduced in the treatment of subjects quite proper to a less advanced stage. Thus on p. 12, after the consideration of the whole subject of running water, we are suddenly introduced in stage A to the conception of alluvial valleys, explained as "flat plains of rich soil deposited by rivers in their lower courses"; yet in the general treatment of running water in the A stage there is no account of the formation of such plains, to understand which one has to consider an action (of a quite simple character) reserved for the C stage, while in the A stage of the general matter we are introduced to the very difficult conception of

a "graded river." It is still worse to meet with statements that cannot but tend to beget confused thinking on the part of the learner, as where we are told that "on a flat surface streams begin by cutting deep perpendicular-sided ravines . . . as in the cañons of Colorado" (p. 8, col. 2), or where, from the wording of the text, a boy would be led to believe that a river in subsiding after a flood deposits matter only along its banks (p. 9, col. 1), or where he is told (p. 32, col. 2) that "the length and direction of rivers [in Great Britain] are largely determined by the surface features," which ought to lead him to try to think what other circumstances may contribute to determining those things. These points may seem trifles, but for the A stage more particularly it is essential that the statements should be strictly accurate and unequivocally clear. More serious misconceptions are sure to be engendered by such statements as that "the circulation of the waters of the ocean brings warmth to the coasts of British Columbia and Western Europe" (p. 18, col. 2). That is quite true if we understand by the coast the mere line of contact of land and water, but boys and girls ought to understand and never forget that it is not true 6 inches inland. Indeed, the whole of the important subject of temperature is very inadequately treated. There is no systematic development and consistent application of the fact stated on p. 16, col. 1, that "movements of air naturally bring warmth to cooler regions or coldness to warmer," and the neglect of this, one of the most serious omissions apparently due to the failing to form a distinct conception of the function of geography, gives rise to other statements in the book that cannot but mislead.

In the preface, Mr. L'Estrange points out that in most of the maps in his book the projections adopted are such as show the parallels of latitude by straight lines. For larger areas the projection most frequently used is the homalographic, which is indeed very good where comparisons of area are important, but is not satisfactory for wind maps, for which it is used in Plate 4, with the result that in the January map the arrows representing the direction of the wind over the Yellow Sea and the Sea of Japan will be read as indicating north-west winds if we refer them to the parallels of latitude, but nearly due north if we refer them to the meridians. By Mr. L'Estrange Mercator's projection is eschewed throughout, but, in spite of its obvious faults, for wind maps there is none better.

The coloured plates, sixty-nine in number, of Mr. L'Estrange's book are now to be had separately under the title of Philips' "Progressive Atlas of Comparative Geography." They consist mainly of maps on each of which there are either names or references by means of letters and numbers printed in brown, blue, and red. On the named maps the brown names are those which it is considered proper for the boys and girls in the A stage to learn, those in B learning also the blue, and those in C adding the red. The maps with references are in other respects duplicates of the named maps, and are intended as test maps. In addition, there are various climatological, commercial, and industrial maps and diagrams, all well executed for the purpose for which they are intended. The "Atlas," like the corresponding plates in the "Geography," is provided with an index on a simple and ingenious plan, only the nearest degrees of latitude and longitude marked on the map being given, with the bearing from the intersection of those lines. Thus Nagpur is entered 20 80 N.W., meaning that it lies north-west of the intersection of 20° N. 80° E., a method which enables one to find the place on the map referred to with great ease. Unquestionably this "Atlas" is fitted to be extremely useful in schools.

"Stanford's Octavo Atlas" is well known for its merits of handiness, of as much fulness as is compatible with its size, and as much clearness as is compatible with its fulness. In this new edition the more important changes that have taken place on the map of the world since the last edition are indicated. The difficulty of inserting new names on the maps might to some extent have been met by inserting them in the index, where the excellent plan is adopted of including more names than are to be found on the maps, so that those who use the atlas are at least enabled to fix the position of a place on the proper map, and thus see its relations to the places which are named thereon. The fact is, however, that some names, such as Kotlass in Russia and Nelson in British Columbia, have already found a place on maps, but not in the index. For a new edition it would be well to reprint this index, abandoning the present plan of giving no reference to the number of a map, but only the name of the country to which a place belongs. Thus one gets the latitude and longitude of a place in Canada, then has to refer to the table of maps at the beginning, and, finally, to ascertain in which of the three maps of Canada there enumerated the place is to be found. In reprinting the index the opportunity might be taken to insert all places omitted. GEO. G. CHISHOLM.

PHOTOGRAPHY FOR COLLEGE STUDENTS.

Photography for Students of Physics and Chemistry. By Prof. Louis Derr. Pp. vii+247. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1906.) Price 6*s.* net.

PROF. DERR is hard to please. He says that good handbooks of photographic manipulation are abundant, but they are apt to be unsatisfactory because their business is not to explain principles. Of complete treatises there are also not a few, but in them the thoughtful student is likely to be "overwhelmed with an avalanche of detail and history"; and monographs are too highly technical and "confined to such limited portions of the photographic field that the desired information generally lies in the gaps between them." He has, therefore, endeavoured to prepare a volume that suffers from none of these disadvantages. He may have suited his book to the needs of his students, but the result